Continued high incidence of acute post-streptococcal glomerulonephritis in the Northern Territory

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Abstract

This report compares acute post-streptococcal glomerulonephritis (APSGN) notifications in the Northern Territory (NT) in 2012 with those of 2008-2011, using data from the NT Notifiable Diseases System. While the number of notifications in 2012 was higher than the preceding 4 years, the rate was not statistically higher. APSGN continues to predominately affect Indigenous children; the overall incidence in this population has not changed since 1995-2007.

There were 2 community interventions carried out in 2012, with no subsequent cases. Continued vigilance, notification and follow up of cases and contacts should continue in order to prevent further cases and decrease APSGN incidence in the NT.

Keywords: Acute post streptococcal glomerulonephritis, APSGN, Northern Territory, surveillance

Background

Acute post-streptococcal glomerulonephritis (APSGN) is an inflammatory disease of the kidneys which occurs 2 to 3 weeks after skin or throat infection with a bacteria, most commonly group A streptococcus.¹ In the Northern Territory (NT) most cases occur following skin infection, often associated with scabies infestation.² Clinical symptoms and signs include facial swelling, oedema, high blood pressure and blood in the urine. Infection can affect the function of the kidneys and while most people with APSGN make

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In the NT, Indigenous children carry the burden of APSGN disease.\(^1\) All notified cases are actively followed up according to NT Guidelines to prevent transmission and limit community outbreaks.\(^1\) The public health response includes education and examination of household contacts for skin infection, scabies infestation and APSGN. Penicillin is offered to all contacts aged 1 to 16 years, the age group most at risk. Contacts outside this age range receive education and further investigation and treatment if indicated.\(^1\)

Historically the occurrence of 4 or more cases of APSGN within a 2 week period in the NT has been indicative of a Territory-wide outbreak.\(^3\) Thus following notification of 4 cases during this timeframe a public health alert is issued to health providers, raising awareness for APSGN case identification and reporting to the Centre for Disease Control (CDC).\(^1\)

When a single community has a clustering of 2 or more cases within a week or 3 in a month, a community intervention is implemented. Prevention strategies concentrate on community control of scabies and skin sores, regular hand washing to decrease the bacteria spreading and treatment of skin sores with a single intramuscular injection of penicillin.\(^1\)

In 2012 there appeared to be higher rates of APSGN than previous years. Hence review of APSGN notifications was undertaken to determine if this increase was real and identify the groups affected.

**Methods**

Cases diagnosed from 2008 to 2012 were extracted from the NT Notifiable Disease System (NTNDS) and analysed using Stata 12.1. In addition, historic trends were examined from 1995 using a report generated from the NTNDS data in the data warehouse using Business Objects. Central Australian cases resident in the northern parts of South Australia were included in the analysis but excluded from rates calculations.

The chi-squared test was used to compare proportions, while Fishers exact test was used if proportions had less than 5 cases. Median ages were compared using the Mann-Whitney U test. Incidence was calculated using NT Government population projections based on Australian Bureau of Statistics estimates.\(^4\)

Discussion with CDC Control staff and a search of CDC surveillance reports identified APSGN events occurring in 2012.

**Results**

Between 2008 and 2012 there were 140 confirmed cases and 16 probable cases of APSGN notified. Figure 1 shows cases by year of diagnosis and region. Of the 156 notifications, 94 (60%) were male, 152 (97%) Indigenous and 148 (95%) aged between 1 and 14 years old. Hospital admission occurred in 131 (92%) of cases. No deaths were reported.

![Figure 1. Cases by year and region 2008 - 2012](image)

In 2012 there were 40 cases of APSGN notified, compared to an average of 29 notifications per year for 2008-2011 (range 14 to 39). Notifications in the Top End were 22 for 2012; compared to an average of 23 per year for 2008-11(range 10 to 34). Central Australia had 18 in 2012 compared with an average of 6 per year for 2008-11 (range 4 to 12).

Rates in the Indigenous population in 2012 did not differ significantly from those of the previous 4 years (49.5 v 40.5 per 100,000 person-years; rate ratio 1.22; 95%CI 0.81-1.80).

In 2012, 58% of cases were female compared to 34% in the previous 4 years (\(\)0.01). Interestingly, the increase in female cases in 2012 was predominately in Central Australia (72% female compared with 45% in the Top End). Figure 2 shows incidence for Indigenous children by sex and Central Australia (CA) and Top End (TE) regions.
There was no statistically significant difference between the proportion of cases which were Indigenous; 95% in 2012 and 98% in 2008-11 (p=0.27). The median age of cases was 6 for both groups (Mann-Whitney U test; p=0.94).

Figure 3 shows notifications since 1995, showing outbreaks historically occurring approximately every 5 years. Overall, the incidence for Indigenous 0 to 14 year olds between 2008-2012 was 120.5 per 100,000 person-years compared with 108.3 per 100,000 person-years for the years 1995-2007 (rate ratio 1.11; 95% CI 0.90 – 1.36; P=0.3).

In 2012, there were 2 community interventions and 3 alerts sent to health care providers. The alerts were issued in January, April and May following notification of 4 cases within a 2 week period.

The first community intervention was carried out in February in a Top End Arnhem Land community following 2 unrelated cases of APSGN occurring within 5 days. Children aged 1 to 16 years were screened at the local health clinic and through house to house screening by 4 teams consisting of health care workers, ‘Family as Teachers’ and council staff. Approximately 81% (581/ 714) of children in the community were screened. Of those 22% had scabies, 36% had skin sores and 34% received benzathine penicillin.3 There were no new cases identified through screening and no subsequent cases notified in that community for 5 months.

The second intervention occurred in a Central Australian community in April following 2 unrelated cases and 1 probable case of APSGN occurring within a 2 day period. In total 77.3% (198/256) of the 1 to 16 year age group were screened, 23.2% had scabies and 58.4% were treated for skin sores.5 No further cases were identified during screening and no cases were notified from that community in 2012 following intervention.

**Discussion**

While the number of notifications in 2012 was the highest of the preceding 5 years, the disease rate was not significantly higher - this was unexpected as there was an impression that transmission had increased in 2012. Interestingly, the major part of the increase in 2012 occurred in Central Australian females. The reason for this is unclear and cannot be derived from information available from notification data. Previous studies have not reported differences in rates between the sexes.6,7

An important issue with APSGN surveillance is the sensitivity of the system. Notifications rely on cases seeking health care, disease recognition by health staff, subsequent laboratory testing, clinical diagnosis and then notification of cases. Thus APSGN is almost certainly under-reported and notifications will fluctuate according to community activities and staff familiarity with APSGN and reporting requirements.

APSGN continues to affect under 15 year old Indigenous children at a high rate due to the continued high prevalence of scabies and streptococcal pyoderma in NT Indigenous communities.8-10 However, due to the issues with notification sensitivity it is difficult to be
certain about trends in disease rates. While the incidence of notified cases does not seem to be falling, the higher number of sporadic or ‘background’ cases in recent years as noted in Figure 3 suggests either an improvement in reporting or a changing epidemiology of the disease.

The current Indigenous incidence of 49.5 per 100 000 person-years still remains above the incidence reported in developing countries (9.3 to 28.5 per 100 000), acknowledging that incidence is almost certainly under-reported in these settings. Thus cases of APSGN should continue to be notified and contacts actively followed up.

Historically epidemics of APSGN have occurred every 5 to 7 years. Last year was the 7th year since the last epidemic so the increase in 2012 may herald the start of the next wave.

Neither of the 2012 community interventions achieved 85% coverage of the 1 to 16 year olds as recommended in the guidelines, despite house to house screening. Estimating denominator numbers of children currently residing in community are inexact, especially in the context of a highly mobile population, so true coverage rates are probably much higher. The lack of further cases following intervention in both communities indicates that the interventions may have been successful in preventing further cases.

The community screenings highlight that scabies and skin sores continue to have high prevalence in young Indigenous people. This is of concern as children are not only at risk of APSGN but also other group A streptococcal associated diseases such as rheumatic fever and its sequelae rheumatic heart disease.

In the NT, APSGN continues to cause morbidity in Indigenous children. Clinicians need to remain vigilant and notify possible and confirmed cases of APSGN to enable targeted education and early interventions in contacts and communities to prevent further cases, particularly as a community outbreak of APSGN is ‘overdue’. Healthy skin programs should be promoted in communities to decrease prevalence of skin sores and scabies and lessen the burden of group A streptococcal associated diseases.

References

Success of Mantoux screening at the Darwin Correctional Centre
Wilhelm Daehn, medical student, Flinders University
Vicki Krause, CDC, Darwin

Abstract

Background
People in correctional facilities are at an increased risk of tuberculosis (TB), compared with the general population. Prisoners are often from populations with higher rates of TB, such as Indigenous Australians and those born overseas. Public health interventions for the identification and prevention of TB in prisons are important. Current “Guidelines for the control of Tuberculosis in the Northern Territory” recommends the screening tests for those entering correctional facilities. Everyone, unless contraindicated, are directed to receive a screening Mantoux test within 24 hours of reception. Those with a Mantoux ≥10mm, a previous positive Mantoux or previously diagnosed TB should be referred to the TB Unit. If active TB is ruled out and latent TB infection (LTBI) diagnosed, LTBI treatment should be offered, unless contraindicated, and the prisoner’s sentence is of sufficient timeframe to accommodate it.

Methods
A retrospective chart-based audit was conducted on people entering the Darwin Correctional Centre (DCC) during the first quarter of 2011. Every person entering a correctional facility receives a health assessment known as a ‘NTC – Reception Health Check’, the details of which are captured in an electronic database; Primary Care Information System (PCIS). Files on PCIS and another electronic database (Community Care Information System-CCIS) were examined to assess adherence to the protocol.

Results
From a cohort of 79, 89.9% (71/79) of prisoners received a reception Mantoux with 74.7% (59/79) offered the screening according to the protocol. Of the 71 prisoners who received a Mantoux, 20 (28.2%) were performed within the recommended 24 hours of reception. Of a total of 69 Mantoux tests read, 41 (59.4%) were read at the recommended 3 days. Of the 19 prisoners requiring referral to the TB Unit, 13 (68.4%) were referred. All diagnosed with LTBI were appropriately managed. Mantoux screening and appropriate follow up were conducted overall on 79% (63 of 79) of prisoners.

Conclusion
A framework for an effective TB screening program via Mantoux testing exists at the DCC. While compliance with the protocol is good adherence is not complete. This may lead to delayed detection or the missing of potential cases of TB and requires continual quality assurance.

Keywords: tuberculosis; latent tuberculosis infection; Mantoux testing; screening; Northern Territory; correctional facility; audit

Introduction
Tuberculosis is a communicable disease caused by bacteria from the Mycobacterium tuberculosis complex group. Most people ‘infected’ with M. tuberculosis do not develop symptomatic (active) tuberculosis (TB) disease. Such people do not feel ill, nor are they infectious to others. The bacteria are encased within granulomas by immune cells, often in the lungs. The bacteria can lie dormant within these granulomas for many years. The ‘infected’ people are said to have latent tuberculosis infection (LTBI). In most cases (about 90%) of LTBI, the bacteria never reactivate. However about 10% of people will, over a lifetime, develop disease. This often occurs when a person’s immune system is weakened by immune modulating disease or immunosuppressive medication allowing the bacteria to reactivate and cause TB disease.1

The Mantoux test is a screening test used to identify people infected with M. tuberculosis. It involves intradermal injection of purified protein extract from the tubercle bacterium. People who have been infected with M. tuberculosis should mount an immune response at the injection site, in the form of a...
raised, hardened papule. The diameter (in millimetres) of any induration is usually measured at 48-72 hours. If there is no induration at the site, the result is expressed as 0mm. Any associated erythema is not measured. The Mantoux test cannot differentiate between active TB disease and LTBI and patients with a positive Mantoux are referred for a chest x-ray and clinical review to role out active disease. Treatment of LTBI is a key strategy to prevent new cases of active TB in the future and to reduce TB transmission in the community. Treatment is recommended for patients with LTBI who have a significant risk of progressing to TB disease. This risk depends on a number of factors, including the patient’s age, whether their infection was likely to have occurred in the previous 2 years and whether they are immunocompromised by disease or medications.

Background

People in correctional facilities are at increased risk of TB, compared with the general population. Prisoners are often from populations with higher rates of TB, such as Indigenous Australians and those born overseas. Prisoners live in close proximity, spending significant periods enclosed within relatively poorly ventilated cells. Because of these factors, much can be gained from implementing and maintaining public health interventions for the identification and prevention of TB in prisons.

The Prisoner Reception Health Assessment document details the screening tests that people entering Northern Territory (NT) correctional facilities require. The section on TB screening is guided by the Guidelines for the Control of Tuberculosis in the Northern Territory, published by the Centre for Disease Control (CDC) of NT Department of Health (DoH). It states that within 24-hours of reception to a correctional facility prisoners should receive a screening Mantoux test unless contraindicated (e.g. previous positive Mantoux, previously diagnosed TB or previous adverse reaction to a Mantoux).

Prisoners with a reception Mantoux ≥10mm or who have a previous positive Mantoux or previously diagnosed TB should be referred to the TB Unit at the CDC for a chest x-ray and clinical review. Preventive treatment for LTBI is recommended if:
- LTBI is diagnosed
- active TB is ruled out
- there are no significant contraindications and
- the prisoner’s sentence is of a timeframe to accommodate LTBI treatment (i.e. generally > 4 months).

The Darwin Correctional Centre (DCC) is the main reception prison for the NT with a capacity for 450 inmates.

Aims

We undertook an audit of prisoners entering the DCC during the first quarter of 2011 to assess the adherence to the TB screening and management established by the prison protocols based on CDC consultation. This audit aims to answer the following questions:
1. Do all prisoners (unless contraindicated) receive a screening Mantoux test?
2. Do any of the prisoners for whom the Mantoux is contraindicated, inappropriately receive one?
3. What proportion of prisoners receive the reception Mantoux within 24 hours of reception?
4. What proportion of prisoners have their reception Mantoux read at 3 days?
5. Are all prisoners for whom it is indicated (reception Mantoux ≥10mm, previous positive Mantoux, previously diagnosed tuberculosis) referred to the TB Unit?
6. Do all prisoners diagnosed with LTBI with no contraindications get offered treatment?

Methods

A retrospective chart-based audit was conducted on people entering the DCC during the first quarter of 2011.

The study cohort was acquired from the Primary Care Information System (PCIS), an electronic database used by the NT DoH. PCIS has a ‘query group search’ function that allows users to construct customised and comprehensive searches.
Every time a client is admitted to a NT Correction Facility, their Primary Care Information System record must be updated. Hence, those listed as receiving a NTC – Reception Health Check should equate to the people entering the DCC.

A query group search was performed to identify those that received a NTC Reception Health Check at the DCC during the first quarter of 2011. The search was limited to January 1, 2011 through to March 31, 2011. The list of people elicited by this search was the audit cohort.

Each prisoner’s hospital reference number (HRN) was recorded and used to open their individual file on PCIS. From each prisoner’s clinical summary, information regarding any previous diagnosis of TB, or any previous adverse reaction to a Mantoux test was recorded. Each prisoner’s previous health encounters were viewed and used to record the following data:

- Date of entry to the DCC (recorded as the date the event NTC – Reception Health Screen was performed)
- Date when the reception Mantoux was given and whether the recall box for reading the test was checked or not (recorded as the date the events ‘NTC – New Reception Pathology’ or ‘Test – Mantoux’ were performed)
- Date when the reception Mantoux was read and its result (recorded from the event ‘Test Result – Mantoux’)
- The dates and results of any previous Mantoux tests.

If evidence was uncovered that suggested referral to the TB Unit was warranted (i.e. reception Mantoux ≥10mm; previous positive Mantoux test), the notes were reviewed to see whether the prisoner was referred to the TB Unit and the outcomes (e.g. diagnosed with TB, offered treatment if diagnosed).

Although most information was extracted from PCIS, information regarding previous Mantoux tests was also extracted from another electronic database used by the TB Unit; known as the Community Care Information System (CCIS).

Ethics

No identifying information was recorded or included in this audit. The audit was registered with and approved by the Human Research Ethics Committee of the NT Department of Health and Menzies School of Health Research.

Results

The query group search on PCIS produced 85 clients. The 6 found to be incarcerated at other facilities were excluded leaving 79 prisoners in the audit cohort.

Questions 1 and 2: Do all prisoners (unless contraindicated) receive a screening Mantoux test? and Do any of the prisoners for whom the Mantoux is contraindicated, inappropriately receive one?

Of the prisoners, 71 of 79 (89.9%) received a reception Mantoux test. Of the 8 prisoners who did not receive a reception Mantoux, none had a recorded contraindication. Of the 71 who received a Mantoux, 12 had a ‘contraindication’ to the test i.e. they had a previous positive Mantoux test recorded (once positive, a Mantoux test does not need to be repeated and therefore this repeat is classified as ‘contraindicated’)

Therefore, 74.7% (59/79) of prisoners were screened at reception according to the protocol.

Question 3: What proportion of prisoners receive the reception Mantoux within 24 hours of reception?

A reception Mantoux was performed on 28.2% (20/71) of prisoners within the recommended 24 hours.

Of the remaining 51 prisoners, the Mantoux was given between 2 to 19 days after reception. The median and mean times to perform the reception Mantoux were 3 days and 3.4 days, respectively.

Question 4: What proportion of prisoners have their reception Mantoux read at 3 days?
Of 71 prisoners receiving a reception Mantoux, 5 were not read. This error was rectified for 3 prisoners, who received a second Mantoux test. Hence, out of 74 Mantoux ‘tests’ administered 69 were eventually read making 69 of 71 tested prisoners (97.2%) having a Mantoux result. Of the 69 tests read, 41 were read at the recommended 3 days, indicating 59.4% compliance with prison guidelines. The range for reading the tests was 2 to 8 days, with the median and mean times to read the test, 3 and 3.7 days, respectively.

When details of a Mantoux administration are recorded on PCIS, staff can click a check box that creates a reminder to read the Mantoux at 3 days. However, it is not compulsory to do so. Statistical analysis was performed to assess whether clicking this check box has any effect on whether the test is read at 3 days. The chi square test ($\chi^2$) was used to calculate the statistical relationship between checking the recall box in PCIS and having the Mantoux test read at 3 days. The result indicated that there was no statistically significant difference in the proportion who had the recall box checked and who had their Mantoux test read at 3 days and those who did not. It was noted however, that of the 5 tests not read, the box was not checked in 4 of them. Meanwhile in the 69 tests that were read, the mean time to read the test was 3.6 days when the box was checked and 4.2 days when it was not.

**Question 5:** Are all prisoners for whom it is indicated (reception Mantoux $\geq 10$ mm, previous positive Mantoux, previously diagnosed tuberculosis) referred to the TB Unit?

There were 19 prisoners indicated for referral to the TB Unit; 10 because of a previous positive Mantoux test, 7 because of a positive reception Mantoux and 2 because of previous positive Mantoux as well as a positive Mantoux at reception (a repeat that was not required).

In fact 14 prisoners were referred to the TB Unit, however 1 prisoner was released prior to his appointment and did not attend. Therefore, 68.4% (13/19) of eligible prisoners were seen at the TB Unit, assessed with a chest x-ray and clinical review and compliant with the protocol.

**Question 6:** Do all prisoners diagnosed with LTBI with no contraindications get offered treatment?

Of the 13 prisoners attending the TB Unit all received a chest x-ray and clinical review and 8 were diagnosed with LTBI. Due to abnormal liver function test findings 1 of these 8 prisoners was not offered treatment and was to be followed up yearly with a symptomatic clinical review. The remaining 7 were all offered LTBI treatment.

As of June 2012, 4 prisoners had completed their course of treatment, 2 were ongoing and fully compliant to date and 1 had ceased treatment due to intolerable side effects and was to be followed up yearly with symptomatic review. These results demonstrate full compliance with the protocol regarding the management of prisoners referred to the TB Unit.

**Discussion**

Australia ranks as having one of the lowest rates of TB in the world. Thus, screening programs for TB in Australia are not universal but rather directed against high-risk groups such as Indigenous Australians in certain areas and arrivals from high-risk countries. Latent TB infection is not a notifiable disease under the National Health Security Act (2007) and currently there is a paucity of reported information regarding the prevalence of LTBI in the Australian population. The available data comes from limited screening programs undertaken in high-risk groups. For example, school screening of 10 years olds for LTBI was conducted yearly in all remote Aboriginal communities in the NT. Data from one such community, indicated that 10-20% of children tested between 1999-2001, had a positive 

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Mantoux test. A study of recently arrived refugees in the NT, found a prevalence of LTBI of 31.9%. A study of prisoners in New South Wales indicated that 12-14% of inmates tested between 1996-2001 had a positive Mantoux test.

From the cohort of 79, 8 prisoners did not have a reception Mantoux. Of the 71 who received a Mantoux, 2 prisoners never had their Mantoux read. With 10 prisoners not screened for LTBI, the 8 cases of LTBI detected, are from 69 tested, equaling a prevalence rate of 11.6%. While this is a small audit and may not be representative of all prison populations, this 11.6% is comparable to the prevalence rates recorded in other high-risk groups. This supports the importance of public health screening for TB and LTBI in prisons.

The framework for an effective TB screening program via Mantoux testing exists at the DCC. Overall 69 of 79 prisoners had a Mantoux test read of whom 50 required no further action. Of the remaining 19 who were Mantoux positive, 13 were appropriately referred. Therefore screening and follow up were conducted overall on 79% (63 of 79 prisoners). However full compliance with the protocol is not being met at various steps.

The finding that only 20 of 71 (28.17%) prisoners received their Mantoux within 24 hours of reception may have consequences. Mantoux tests read after 72 hours may underestimate or miss potential positive readings. Therefore the finding that 33 of the 74 Mantoux tests administered (44.59%) were not read at 3 days may cause potential cases to be delayed in their diagnosis or missed completely. Of the 19 prisoners that required referral to the TB Unit, 6 were never referred. Lack of full compliance at steps along the screening process may contribute to delayed detection or the missing of potential cases of TB.

Some of these failings may be explained by simple oversight or logistical problems. Discussions with clinicians at the DCC indicate that inherent factors exist at correctional facilities that delay or prevent scheduled health encounters from occurring. Prisoners being under the influence of alcohol or other substances upon entering can delay administration of the reception Mantoux. Likewise, abusive or threatening behaviour by prisoners at reception can also delay administration of the reception Mantoux or reading the Mantoux at 3 days. Staff shortages and prisoners being absent while attending judicial hearings also have the potential to delay or prevent scheduled health encounters.

Another reason for lack of full compliance may be the ambiguous wording of the ‘Prisoner Reception Health Assessment Policy’ and may explain why at least 4 prisoners did not receive a reception Mantoux. It states that for prisoners returning to prison within 6 months of a previous incarceration ‘standard pathology screening would only be repeated if there were clinical concerns’. TB screening is not considered standard pathology screening. Unless contraindicated, a reception Mantoux should be administered at every incarceration. However the ‘Prisoner Reception Health Assessment Policy’ as it was written may be interpreted to mean that no screening tests are required for people returning to prison within 6 months if there are no clinical concerns. Of the prisoners that did not receive a reception Mantoux 4 were returning to prison within 6 months of a previous incarceration. None of these prisoners received a reception Mantoux or the other standard pathology screening tests. This error may reflect a misinterpretation of policy.

Additionally, prison staff do not currently have access to CCIS. Information listed in CCIS is not necessarily listed on PCIS and vice versa. Inappropriate Mantoux tests were given at reception to 12 prisoners, even though records existed, somewhere, of a previously positive Mantoux. In the case of 4 of the prisoners their previous positive Mantoux results were only recorded on CCIS. Hence, this needless retesting may be due to prison staff not having access to all health records. Likewise the lack of access to CCIS may explain why some prisoners were never referred to the TB Unit. If staff are unaware of a previous positive Mantoux, and the prisoner goes on to record a reception Mantoux of 0mm, then in the minds of prison staff there is no apparent indication for referral. Indeed, the 4 prisoners whose previous positive result was only available on CCIS, all recorded a reception Mantoux of 0mm. None of these clients were referred to the TB Unit.
Prison guidelines state that Mantoux tests should be read at 3 days. However the CDC protocol from which the prison guidelines is based, states that a Mantoux test can be reliably read between 2-5 days post administration although maximum induration occurs at 72 hours. Other sources suggest the test can be read up to 7 days following administration. Of the 33 tests not read at 3 days, 1 was read at 2 days, 14 at 4 days, 7 at 5 days and 2 each at days 6 and 8, with 5 never read. Under the CDC protocol, this means that 63 of 74 (85.14%) tests were read at an acceptable timeframe, with the result rising to 67 of 74 (90.54%) if 7 days is taken as the outer limit. While the audit finds 59.41% compliance with the policy of 3 days, the majority of tests are being read at an acceptable, although not optimal, timeframe.

There are some limitations to this audit. Every person entering a correctional facility should receive a ‘NTC – Reception Health Check’, making the number of reception health checks equal to the number of people entering the facility. This assumes 100% compliance with the protocol and discussions with clinicians at the DCC indicated that this is not achieved, especially in those detained only a few days. Recognising that generating the audit cohort via such a method is a limitation and potential source of error, the Department of Justice was contacted to obtain a list of those who entered the DCC during the audit timeframe. Such a list was not able to be provided. Therefore there is some uncertainty that the cohort obtained from PCIS is fully representative of the actual number of people entering the DCC during the audit timeframe. Another limitation could be that data was not entered on the electronic database. Informal indications from staff suggested almost all reception checks were entered. Finally this audit was completed over a relatively short timeframe and therefore the final sample is relatively small.

**Conclusion and recommendations**

Despite some limitations this study reveals that full compliance with the correctional protocol for TB screening is not always being achieved. This may delay detection or contribute to missing potential cases of LTBI or TB. It is important to acknowledge the limitations imposed on prison staff by not having access to CCIS as well as the inherent factors in correctional facilities that delay or prevent health encounters from occurring. Some of these factors are difficult to change and the goal of full compliance with the protocol may be unachievable in this environment. Additionally it should be recognised that currently the NT is 1 of the only prison systems carrying out TB screening. Therefore, while full compliance may not be reached, there is a level of awareness and investigation regarding TB that may not be in other jurisdictions and is beneficial to the NT. Nevertheless, the following recommendations are aimed at providing some guidance for improvements:

- Introducing access to CCIS information to correctional facilities would allow more thorough background checks of prisoner’s health record to be undertaken. This would reduce the incidence of inappropriate Mantoux tests from being given as well as increase the likelihood of prisoners with relevant histories being referred to the TB Unit.
- Altering the wording of the ‘Prisoner Reception Health Assessment Policy’ so that it is clear that screening for TB is recommended at every intake.
- Altering the PCIS software so that the prisoner’s file cannot be closed without clicking the check box may improve the rate of Mantoux tests being read at 3 days.
- Consideration may be given to replacing the screening Mantoux test with an interferon gamma release assay (IGRA) for testing for TB infection. Although such a change may be more costly, a recent meta-analysis has suggested it may be more specific than the Mantoux test in certain circumstances. Unlike the Mantoux test which can produce false-positive results, in people vaccinated with the BCG vaccine as adolescents or adults, an IGRA is not affected by prior BCG vaccination. As an IGRA can be completed during a single encounter the problems created by having to read the Mantoux at 3 days would be eliminated. The IGRA test, while not always conclusive, is less subject to reader bias and does not boost an amnestic immune responses.

In conclusion, the framework for an effective TB screening program via Mantoux testing exists at the DCC and while not fully adhered to,
79% had appropriate Mantoux screening on reception and where LTBI cases where diagnosed, dealt with appropriately. Any such screening program requires continual quality assurance.

Acknowledgements

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The Adolescent Sexuality Education Project – A NT innovation designed to improve the sexual health of young Aboriginal people
Michael Borenstein, Lida Curran, Emma Fajardo, Edwin Lubari and Tatenda Murid, CDC, Darwin.

Abstract

Young Aboriginal people in the Northern Territory experience the highest level of sexually transmitted infections and teen pregnancies in Australia. Anecdotally sexuality education has been delivered in an unsustainable ad hoc manner. The Adolescent Sexuality Education Project utilises a community development approach to build the capacity of communities to deliver sexuality education through a process of consultation, participation and collaboration. These investments are designed to create an enabling environment where communities are empowered to deliver culturally informed sexuality education in a sustainable manner.

Keywords: sexuality; education; young people; sexuality transmitted infection; Aboriginal; community development; capacity; enabling environment; sustainability; Northern Territory

Introduction

The Adolescent Sexuality Education Project (ASEP) is a collaboration between the Northern Territory (NT) Department of Education and Children’s Services (DECS) and the Department of Health (DoH) in association with the Central Australian Aboriginal Congress (CAAC) and is a component of the National Partnership Agreement on Indigenous Early Childhood Development. The partnership is funded for 5 years by the Office of Aboriginal and Torres Strait Islander Health to provide targeted sexual and reproductive health education to Indigenous adolescents in schools and community settings.

Background

The NT has the highest notification rates of sexually transmitted infections (STIs) in Australia with the greatest number of notifications occurring among Indigenous 15–19 year olds.¹ Teen pregnancies in the NT among young Aboriginal women are by far the highest in Australia.²,³ Young Aboriginal women in the NT have a fertility rate which is more than 7 times higher than the national average (Table 1).

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<td>39.8</td>
<td>10.8</td>
</tr>
<tr>
<td>Queensland</td>
<td>71.2</td>
<td>22.4</td>
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<tr>
<td>South Australia</td>
<td>71.9</td>
<td>15.5</td>
</tr>
<tr>
<td>Western Australia</td>
<td>96.8</td>
<td>21.2</td>
</tr>
<tr>
<td>Tasmania</td>
<td>37.4</td>
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</tr>
<tr>
<td>Northern Territory</td>
<td>127.3</td>
<td>67.6</td>
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<tr>
<td>Australian Capital Territory</td>
<td>27.3</td>
<td>11.8</td>
</tr>
<tr>
<td>Australia</td>
<td>77.6</td>
<td>18.1</td>
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</table>

Indigenous rates are based on the 1996 Census-based projected population for 1999, low series; Experimental Projections of the Aboriginal and Torres Strait Islander Population, 1996-2001 (ABS Cat. no. 3231.0).

Methods

In early 2010 a needs analysis was undertaken to review school based and community-based sexuality education being delivered to Aboriginal adolescents across the NT.⁵ The analysis served to identify both the strengths and weaknesses of sexuality education highlighting the challenges for delivery, opportunities for the future, community priorities and the availability of appropriate resources.⁶ Anecdotal evidence suggested that sexuality education in the NT had generally been delivered in a somewhat ad hoc manner, during events including health days and community-wide STI screening or provided by visiting health practitioners in schools.⁵ According to the UNESCO guidelines best practice sexuality education should be imbedded in school and outside of school settings and should be delivered sequentially over at least 10 weekly sessions to have any significant impact.⁶ The needs analysis recommended a community development approach be undertaken in the development, implementation
and governance of sexuality education and to embed sexuality education into community settings in a culturally appropriate and sustainable manner.

Central Australian Aboriginal Congress Young Women’s Community Health Education Program (YWCHEP) was identified as a culturally appropriate sexuality education resource already developed and in use for women in Central Australia. The ASEPs formed a collaboration with CAAC and funded the development of a male version of the resource. The resources were then reviewed and updated to conform to international best practice guidelines in sexuality education utilising UNESCO guidelines and the Douglas Kirby sexuality education assessment tool. On completion CAAC reviewed the content to address cultural sensitivity issues. The YWCHEP was then mapped with links to the NT DECS curriculum framework. Adolescent Sexual Health Promotion Officers (ASHPOs), 8 in total were then employed to implement the program utilising the recommended community development approach.

The community development approach

This approach recognises the community as the best resource to draw on to solve the challenges faced by the community. In this case the challenge is to provide best practice sexuality education to young people. To capitalise on the community as a resource, authentic consultation is required to solicit community participation in the development, delivery and governance of community based sexuality education. The approach is aimed at achieving sustainable outcomes by seating sexuality education within the community rather than being driven by external professionals who may not possess the cultural knowledge required to deliver sexuality education in an appropriate manner.

Community consultation

Community consultation is central to the community development approach employed by the ASEPs. Consultation is an exploration of the unknown and participation from the community and other local stakeholders provides the insight required to implement localised solutions to the challenges faced by the community. Each community differs and thus the process of consultation varies in each location. In some communities telephone and email correspondence followed by community meetings with Aboriginal elders and key stakeholders may be all that is required to gain approval to conduct community based sexuality educator training. In other settings this process can take many months requiring multiple visits comprising of a variety of community based meetings. These meetings may occur in a mix of formal and informal settings and can range from office based stakeholder meetings through to focus group discussions in bush settings with community elders. The meetings assist to identify the most appropriate individuals to train as sexuality educators, the location for training to occur, which stakeholders to be involved and to establish the appropriateness of the resources. Sexuality education resources often require adaption or translation to ensure the program meets the cultural norms of the local setting. The above approach aids the development of the enabling environment which supports community based sexuality education to occur in a sustainable manner.

An independent consultant was contracted to undertake a formal evaluation of the ASEPs and its performance in school and community settings. An evaluation framework was developed and implemented in collaboration with the independent evaluators, DoH, DECS and CAAC. The final report will be delivered towards the end of the current funding period in mid-2014. Additionally ASEPs staff undertake ongoing data collection to track the progress of the project and to modify the model where required. Below is a summary of the ASEPs achievements after its first 18 months of implementation.

Preliminary results

As of December 2012 a total of 706 people have been consulted through the process of community consultation meetings held across the NT over the past 18 months (Table 2).

A total of 327 people have been trained as sexuality educators across 13 sites throughout the NT since the project was implemented (Table 3).
After completing the training 100% of participants indicated in feedback surveys they believed they would implement sexuality education in their community.

To date 7 schools and 2 community settings have implemented sexuality education (Figure).

Table 2. People consulted by region, gender and ethnicity

<table>
<thead>
<tr>
<th>Region</th>
<th>Indigenous</th>
<th>non-Indigenous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top End Women</td>
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<td>128</td>
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<tr>
<td>Top End Men</td>
<td>90</td>
<td>75</td>
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<td>Alice Springs Men</td>
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</tr>
</tbody>
</table>

Discussion

The majority of people consulted during the implementation stage of the project have been Aboriginal (Tables 2 and 3) demonstrating a high degree of community participation. Men have participated less than women in the consultation and training processes and this could become a challenge for the ASEP into the future. Lower levels of male participation are more pronounced in the uptake of educator training which is likely to indicate a reluctance by men to become sexuality educators. Current levels of male participation have not impeded the project from meeting its goals but clearly represent a challenge. The disparity between people consulted and trained regionally from the Top-End region, Katherine and Alice Springs (Table 2) correspond with ASEPs staggered recruitment process. Staffing levels reached full capacity with Alice Springs and East Arnhem staff coming on board mid-2012.

After completing training 100% of participants indicated they would implement sexuality education in their communities. This represents a significant strength of the project and highlights the need to capitalise on the sentiment of training participants through the provision of appropriate levels of follow up and support. ASEP maintains ongoing contact with communities post training to ensure implementation and ongoing delivery of sexuality education is supported.

Despite the collaboration between DoH and DECS and the commitment of community stakeholders many schools remain reluctant to collaborate in the deliver of sexuality education. Some schools indicate that sexuality education should be the responsibility of the DoH while others cite a reluctance to deliver sexuality education due to cultural concerns. Additionally when considering the unique environment of the NT, where school attendance is often low, the reliance on schools as the principal point for sexuality education delivery may not be able to reap anticipated outcomes. This is supported by literature indicating the need for a comprehensive approach to sexuality education to reach beyond school settings. With over 192 schools in the NT it is clear the ASEP will require continued investments into the future to achieve its mandate of universal access to sexuality education.

The ultimate goal of the project is 2 fold. On one hand it is designed to empower young people to make healthy choices in relation to their sexuality and personal relationships and on the other hand it is firmly aimed at behaviour change designed to lower STIs and decrease unplanned pregnancies among young people. The outputs of community development projects cannot be measured accurately over the short
term. Equally behaviour change is incremental and can require generational investments. Therefore big picture outcomes aspired to by the project may take a relatively extended time period to come to fruition.

Conclusion

The community development approach taken by the ASEP is in its infancy but initial assessments are encouraging. The identification of locally developed resources coupled with the utilisation of international guidelines have increased program relevance and facilitated the transfer of lessons learnt into best practice. Adaptability to the local context has been a core contributor to the success of the project. Translating this to sustainable outcomes will require commitment and investment into the long term. Notwithstanding the above considerations the current evaluation will be completed mid-2014 and should provide important information to guide strategic planning into the future.

Key challenges will be to increase the participation of Aboriginal men as sexuality educators and to increase the speed of implementation through gaining greater acceptance of the program in schools. Additionally increased investments into strategies to reach young people who no longer attend school should remain a priority.

The purpose of the project is to improve the sexual health of the population and ultimately lower rates of STIs and teen pregnancies by utilising a process of community engagement and empowerment. The project seeks to engage communities in an essential human right: the right to health and education and the right to access appropriate accurate information allowing young people to make informed choices in their lives.

The ASEP is working towards a NT where sexuality can be expressed respectfully by informed individuals free from physical or psychological harm. Community development is ultimately geared towards the facilitation of social transformation through the participation and collaboration of communities. The ASEP can only achieve its goal through building authentic partnerships with communities and community stakeholders and through long term investments in the enabling environment. Functional respectful and trusting relationships are at the core of this endeavor.

Acknowledgements

We would like to thank the following people who have had significant input into this project: Jocelyn Perry, Jamie Broadfoot, Vicki Krause, Steven Skov, Nathan Ryder, Jiunn-Yih Su, Jan Holt, Joel Curtian, Michael O’ Halloran, Debi Bodden, Kyle Osborne, Greta Enbom, Blake Edwards, Raenae Reeves, Katherine Moriarty, Donna Lemon, Wayne Campbell, Fiona Haddon, Sheralee Fitz, Natalie Norsworthy, Warwick Beever, Isabella Tusa. The ASEP would also like to acknowledge and thank those communities who have generously embraced the project.

References

A case of gastroenteritis possibly caused by *Chromobacterium violaceum* in the Northern Territory of Australia.

Anthony Draper¹, Mark De Souza² and Rob Baird³

¹OzFoodNet Epidemiologist, CDC Darwin, ²Emergency Physician, Royal Darwin Hospital, ³Director of Pathology, Northern Territory Government Pathology Service

Abstract

The OzFoodNet epidemiologist position is based in the Centre for Disease Control (Darwin) within the Department of Health and is funded by the Australian Government.

The purpose of the position is to enhance enteric disease surveillance in the Northern Territory and to assist with foodborne and non-foodborne illness investigations.

We report a case of gastroenteritis possibly caused by *Chromobacterium violaceum*.

Keywords: *Chromobacterium violaceum*, OzFoodNet; bloody diarrhoea; bore water; gastroenteritis; Northern Territory.

The case

In May 2013, the Northern Territory (NT) Centre for Disease Control (CDC) was notified of a child suffering from diarrhoea attributed to infection with *Chromobacterium violaceum*.

A 4 year old non-Indigenous female attended the emergency department with bloody and watery diarrhoea of approximately 12 hours duration. The child had experienced 5 days of malaise and fevers (up to 40°C) prior to onset of diarrhoea but was reported as being otherwise healthy and active prior to the onset of symptoms. No urinary tract infection (UTI), pneumonia or respiratory distress was reported. No sores or lesions were reported apart from the normal minor grazes associated with childhood.

A stool sample was collected and tested negative for rotavirus. No ova, cysts or parasites were detected and *Giardia* spp. and *Cryptosporidium* spp. antigen were not detected. *C. violaceum* was isolated from the stool and no other pathogens were cultured. No blood samples were drawn.

No exposure to mud, muddy water, dams or natural freshwater bodies was recorded in the 2 weeks prior to the onset of symptoms.

However, it was reported that the child played in the dirt in their backyard and regularly swam in a backyard swimming pool which was filled from a private bore. The swimming pool was treated by an automatic salt water chlorination system. In 2008, the untreated bore water which filled the swimming pool tested positive for *Burkholderia pseudomallei*, the causative agent of melioidosis.

The child was not treated with antibiotics and made a full recovery after 8 days of illness.

Discussion

*Chromobacterium violaceum* is a gram negative, facultatively anaerobic, motile, oxidase positive bacillus which is widely distributed in soil and water in tropical and sub-tropical regions.¹⁻³⁻⁴⁻⁵ It has also been detected in bore water samples.⁶ Infection usually occurs after the exposure of cuts or scratches to mud or muddy water or pneumonia and systemic infection can follow near-drowning incidences.⁷

On microbiological culture media, some strains produce a pigment called violacein which can give colonies a remarkable purple colour. It appears as a non-lactose fermenter (NLF) on MacConkey agar and on blood and chromogenic agar produces smooth deep purple to black colonies which are extremely distinctive.⁸ It should be noted that *Salmonella* spp. also produce black colonies on xylose lysine deoxycholate agar (XLD) agar which is part of the routine culture for faecal specimens in many diagnostic pathology laboratories.

*C. violaceum* was first described as a human pathogen in Malaysia in 1927⁹ and infections are rarely reported.
A 2011 literature review of 106 *C. violaceum* infections showed that the 4 most common clinical manifestations were fever (100%), sepsis (82%), skin lesions (67.9%) and abdominal pain (31%) with metastatic abscesses present in 49% of cases. The clinical manifestations of *C. violaceum* infection include UTI, pneumonia, gastrointestinal infection, cutaneous lesions, localised or metastatic abscesses, osteomyelitis, meningitis, peritonitis, brain abscesses, endocarditis, haemophagocytic syndrome, respiratory distress syndrome and fulminant sepsis. A mortality rate of 53% was reported. *C. violaceum* is not a well known cause of diarrhoea but cases have previously been reported in Senegal and India. In the NT, only a handful of cases have been reported previously and all were the result of percutaneous inoculation. *C. violaceum* has been isolated from stools in the NT previously but this was considered colonisation rather than infection. This is the first case of gastroenteritis attributed to *C. violaceum* reported in the NT. The average incubation period for *C. violaceum* is 3 days and most young patients who present with chromobacteriosis have predisposed themselves to the bacteria by wading in water, playing in muddy water, swimming or falling in water. In this case, the child most likely ingested the bacteria while swimming in a pool or when playing in soil which resulted in a diarrhoeal illness.

The clinical symptoms and severity of systemic *C. violaceum* infection resemble those of melioidosis, caused by the bacterium *Burkholderia pseudomallei* which is also a gram-negative, oxidase positive bacillus. Furthermore, they are both ubiquitous in soil and mud with infections more likely during the wet season. It is thought that previously, some strains of *B. pseudomallei* could have been potentially misidentified as *C. violaceum* using the API 20NE panel of tests.

For effective treatment of systemic *C. violaceum* infection, antimicrobial sensitivity testing is important in order to confirm susceptibilities. The most successful empirical antimicrobial regimens have involved combination therapy with chloramphenicol, beta-lactams, trimethoprim-sulphamethoxazole, tetracycline or fluroquinolone along with one of the aminoglycosides. However, resistance to beta lactams is common. It is advisable to screen patients with *C. violaceum* infections for chronic granulomatous disease.

In this case *C. violaceum* was the only potential pathogen identified but the child made a full recovery without antibiotic therapy. Therefore it remains speculative as to whether the bloody diarrhoea was caused by *C. violaceum* acquired from the child’s environment, but that scenario is certainly possible.

**Conclusion**

*Chromobacterium violaceum* was isolated as a possible cause of bloody diarrhoea in a 4 year old non-Indigenous female. *C. violaceum* infections, particularly those which result only in gastrointestinal illness are very rare. In cases of septic illness where skin lesions and internal abscesses are present or where exposure to soil, mud or muddy water has occurred, *C. violaceum* and *B. pseudomallei* should both be included in the differential diagnosis.

**References**

Enteric disease in the Northern Territory in 2012

Anthony Draper, OzFoodNet Epidemiologist, CDC, Darwin

Abstract

In 2012, notifications of salmonellosis, shigellosis and campylobacteriosis were lower than expected. There was however, a 75% increase in cryptosporidiosis notifications when compared to the 5 year mean, with cases associated with childcare centres and public swimming pools. There were a number of foodborne and non-foodborne disease outbreaks conducted in 2012. Cases of typhoid were higher in 2012 than in previous years.

Keywords: OzFoodNet, salmonellosis, typhoid, shigellosis, campylobacteriosis, cryptosporidiosis, outbreak, cluster

Methods

Data was extracted from the NT Notifiable Diseases System (NTNDS) and also analysed from the data warehouse using Business Objects. Population figures were obtained from the NT Department of Health’s Health Gains Planning population data.

Results

In 2012 there were 747 notifications of foodborne or potentially foodborne disease* reported in the NT. This is 8% less than the 5 year mean (811) and 7% more than the previous year (695). Salmonellosis notifications accounted for 58% of the foodborne disease notifications in the NT, followed by campylobacteriosis notifications (25%) and shigellosis notifications (16%).

There were 362 non-foodborne enteric disease notifications reported in the NT in 2012. This is on par with the 5 year mean (363) but 16% more than the previous year (311). Cryptosporidiosis notifications made up 67% of these non-foodborne disease notifications, followed by rotavirus (32%) and hepatitis A (1%).

This includes total number of notifications for amoebiasis, botulism, brucellosis, campylobacteriosis, cholera, salmonellosis, shigellosis, STEC/VTEC, typhoid, yersiniosis, ciguatera, vibrio food poisoning, and listeriosis.

It does not include rotavirus, cryptosporidiosis, hepatitis A and hepatitis E.
were 5 foodborne or suspected foodborne outbreaks, 16 non-foodborne outbreaks and 8 clusters investigated in 2012.

Salmonellosis

In 2012 there were 434 notifications of salmonellosis in the NT. This is 11% less than expected when compared to the 5 year mean (490 cases) and on par with the number of notifications received in the previous year (435). The median age of salmonellosis cases was 3 years (range 0 – 80 years; mean 18.8 years).

The highest rate of disease was seen in the 0-4 year age group with a rate of 1192 cases per 100 000. This age group represents 53% of all salmonellosis notifications in the NT (231 cases). The rates of disease between males and females in the 0-4 years age group was roughly the same with 1251 cases per 100 000 population for males (124 cases) and 1130 cases per 100 000 for females (107 cases).

The rate of salmonellosis in the Indigenous population was 223 cases per 100 000 (158 cases) compared to 151 cases per 100 000 (251 cases) in the non-Indigenous population. This equates to a rate ratio of 1.5 (95% CI 1.2 - 1.8, p =< 0.01). In the 0-4 year age group, there was no significant difference in the rate of disease in the Indigenous population (1151 cases per 100 000, 98 cases) compared to the non-Indigenous population (1132 cases per 100 000, 123 cases) (rate ratio 1.01, 95% CI 0.8-1.3, p = 0.45). Figure 1 shows the rate of disease of salmonellosis by age and Indigenous status in 2012.

Reports of salmonellosis normally increase during the wetter, warmer months of the year. In 2012, salmonellosis cases again peaked from February through to May. Case numbers declined during the cooler and drier months; a seasonal trend that has been noted in previous years.

In 2012, 98% of Salmonella isolates were identified to the serovar level (427 out of 434). The most frequent serovar was Salmonella Virchow (n=54), followed by S. Typhimurium (n=48), S. Saintpaul (n=40) and S. Ball (n=31). In the past, S. Ball and S. Saintpaul were the most commonly reported serovars in the NT.

The incidence of S. Virchow continues to increase. The 54 cases of S. Virchow reported represented a 32% increase compared to 2011 (41) and was 9% more than the 5 year mean (50). Of the S. Virchow isolates reported in 2012, the majority (65%) were S. Virchow PT 8 (35 of 54 isolates) with the remainder being sporadic cases of various other phage types; 1 isolate was unable to be typed.

The number of cases of ‘environmental’ Salmonella serovars was variable in 2012 compared to previous years. Reported case numbers for S. Saintpaul were 22% less than expected (40 compared to the 5 year mean of 51) and 26% less than the previous year (54). Case numbers of S. Ball were 31% less than expected (31 compared to the 5 year mean of 41) and differed little from the previous year (30). Case numbers of S. Lansing were 27% less than expected (19 compared to the 5 year mean of 26) and also 27% less than the previous year (26).

There were 48 cases of S. Typhimurium (STm) reported in 2012. This was just under the 5 year mean of 51 cases and 6% less than the number of cases reported in the previous year (51 cases). There was a variety of different phage types (PT) of S. Typhimurium reported in 2012 with S. Typhimurium 9 (11 cases), S. Typhimurium 108 (8 cases), S. Typhimurium 135a (6 cases) and S. Typhimurium 22 (6 cases) most commonly reported.

Typhoid

There were 4 cases of typhoid reported in the NT in 2012 which is more than expected when compared to the previous 5 year mean of 1.8 cases per year. All cases were acquired overseas.
Of the 4 cases 2 cases acquired their infections in India while the others acquired their infections in Myanmar (Burma) and Bangladesh. Males represented 3 out of 4 cases with a median age of 24 years old. None of the reported cases had a previous known history of typhoid infection nor had any been immunised against *Salmonella* Typhi. Additionally, 3 of 4 cases were returning to their respective countries of birth.

While 3 of the 4 cases became unwell after the expected incubation period (3-60 days), 1 case did not become ill until 6 months after travel to a typhoid endemic country. This case presented with abdominal pain and subsequent stool culture was positive for *S. Typhi*. An abdominal CT scan showed stones in the gallbladder with no associated inflammation. This case was excluded from their work as a food handler until an abdominal cholecystectomy and 3 subsequent negative stool samples were collected.

The NT has reported 7 cases of typhoid since 2011, all in people returning from typhoid endemic countries. All 4 reported cases in 2012 were either returning to their birth countries or visiting family members in typhoid endemic countries. This type of traveller is less likely to seek pre-travel health advice and vaccination.

**Campylobacteriosis**

In 2012 there were 187 notifications of campylobacteriosis in the NT. This was 12% less than the expected number of cases (5 year mean = 200) and 12% more than the previous year (167). The median age of campylobacteriosis cases was 23 years (range 0 – 86 years; mean 27.5 years). Speciation of *Campylobacter* isolates is not routinely done by NT laboratories and the majority of isolates (99%) were reported as *Campylobacter species*.

Non-Indigenous rates of campylobacteriosis (82 per 100 000) were higher than Indigenous rates (51 per 100 000) with a rate ratio of = 1.6 (95% CI 1.1-2.4, p = <0.01). The highest number of cases and rate of disease was seen in the 0-4 year age group with 268 cases per 100 000 population. Of the 52 cases recorded in this age group, 49 were Indigenous and this accounted for 42% of all shigellosis notifications. Shigellosis is more commonly reported in the Indigenous population. The rate of shigellosis in the Indigenous population was 134 cases per 100 000 compared to 14 cases per 100 000 in the non-Indigenous population, rate ratio = 9.7 (95% CI 7.8-11.8, P<0.0001).

The overall rate of disease varied between the sexes, with 63 cases per 100 000 in females (72 cases) vs. 38 cases per 100 000 in males (46 cases), rate ratio = 1.7 (95% CI 1.1-2.5, p = <0.01).

The most commonly reported species of *Shigella* was *Shigella sonnei* (98 cases) followed by
Shigella flexneri (13 cases). The most commonly reported biotype was S. sonnei biotype a (90 cases) followed by S. flexneri 4a mannitol negative variant (8 cases).

The upward trend in notifications of S. sonnei biotype a since 2011 has continued. In 2012 the highest number of cases (90) ever was reported (Figure 3). Cases attributed to S. flexneri 4a mannitol negative variant appear to be on the decline and cases of S. flexneri 2a are virtually non-existent after being the dominant biotype in 2003 and 2004.

The reasons for the changing patterns in the different biotypes reported are unknown. Cases of shigellosis have been largely sporadic in nature with few clusters or outbreaks detected.

Cases of S. flexneri 3a have continued to decline in 2011 and 2012 after a rise in numbers between 2006 and 2010. S. sonnei biotype a has been the dominant species/serotype in 2011 and 2012.

Cryptosporidiosis

In 2012 there were 243 notifications of cryptosporidiosis. This is 75% more than the 5 year mean (139 cases) and 156% higher than the previous year (95 cases). Median age of cases was 1 year (range 0-74 years, mean 9.2 years).

Cryptosporidiosis is predominantly a disease reported in children (Figure 4), with 179 of the 243 (74%) cases notified being in the 0-4 year age group. In the overall population the rate of disease between the sexes was similar (males 105/100 000 vs females 100/100 000).

The rate of disease was slightly higher in the Indigenous population with 116 cases per 100 000 (82 cases) compared to 90 cases per 100 000 (150 cases) in the non-Indigenous population (rate ratio = 1.3, 95% CI 1.0-1.7, p = 0.04). The rate of disease in the 0-4 year age group was similar between Indigenous children (869 cases per 100 000, 74 cases) and non-Indigenous children (939 cases per 100 000, 102 cases), rate ratio = 1.1, 95% CI 0.9-1.3, P=0.43)

In 2012, the peak number of cases occurred during and immediately following the wet season which is traditionally October through to May. There were relatively high numbers of notifications of cryptosporidiosis in the wet season of 2011-2012 which corresponded with at least 6 outbreaks associated with childcare centres. In 2012, the rate of cryptosporidiosis nationally was 13.9 per 100 000 which is 20% higher than the 5 year mean."

STEC/HUS

There were 2 cases of Shiga toxin-producing E.Coli (STEC) reported in 2012. There was 1 STEC case was reported in a 26 year old non-Indigenous male who had travelled from the Barkly region to South Australia for a holiday and was diagnosed in Adelaide. Both stx1 and stx2 toxin genes were detected. No organism was recovered from stool cultures for typing. The patient did not develop haemolytic uraemic syndrome (HUS) and made a full recovery.

The second case was reported in a 33 year old Indigenous male who was among a group of
5 who developed severe and bloody diarrhoea after eating a kangaroo which was killed, butchered, cooked and eaten in a remote community. His stool sample tested positive for the stx2 toxin gene produced by Shiga toxin-producing E. coli (STEC). Multiplex PCR testing confirmed this result with the sample also testing weakly positive for the hlyA gene, but negative for stx1, eae and saa. The sample tested negative for rfb serotype genes, O157, O111 and O113. The patient did not develop HUS and made a full recovery.

STEC is not routinely tested for by most of the laboratories that service the NT. The sporadic cases that are reported are usually found in the region where IMVS/Medvet laboratory provides a pathology service (Central Australia) as all blood-stained stool samples are screened for STEC as part of their standard procedure.

**Yersiniosis**

There were no cases of yersiniosis reported in the NT in 2012. Yersiniosis is not often reported in the NT and it has been previously noted that there may be different testing procedures in laboratories that account for the cases that are/are not reported in the NT.

**Listeriosis**

There were no cases of listeriosis reported in the NT in 2012. Listeriosis is not often reported in the NT. There have been only 2 cases reported in the 5 year period from 2008 to 2012.

In 2012, there was a nationwide outbreak of listeriosis associated with a Victorian cheese manufacturer. As of 1 July 2013, there were 34 confirmed cases in the outbreak from 6 jurisdictions, resulting in 6 deaths and 1 miscarriage. None of the implicated product was distributed to the NT and no cases associated with this outbreak were reported in the NT.

**Amoebiasis**

There was 1 case of amoebiasis reported in a 3 year old non-Indigenous female. The case was detected by stool analysis. No overseas travel was reported.

**Outbreak and cluster investigations**

There were 5 foodborne or suspected foodborne outbreaks, 16 non-foodborne outbreaks and 8 clusters investigated in 2012.

Of the 5 foodborne or suspected foodborne outbreaks, norovirus was implicated as the aetiological agent in 2 outbreaks and Shiga toxin-producing E. coli (STEC) was implicated in 1 outbreak. A summary of these outbreaks is included in table 1.

There were 15 non-foodborne outbreaks investigated in the NT during 2012. These outbreaks mainly occurred in childcare centres (10) and schools (2). Norovirus was implicated in 2 of the outbreaks; Cryptosporidium spp. was the aetiological agent in 6 outbreaks; Shigella sonnei biotype a and rotavirus were the likely cause of 1 outbreak each. A summary of these outbreaks is included in table 2.

There were 8 cluster investigations performed during 2012. Of these cluster investigations, 5 concerned Salmonella serovars and 3 were clusters of cryptosporidiosis. The cryptosporidiosis clusters often preceded the detection of larger cryptosporidiosis outbreaks.

<table>
<thead>
<tr>
<th>Outbreak register / number</th>
<th>Onset month</th>
<th>Aetiology (no lab confirmed cases)</th>
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<th>Cases</th>
<th>Transmission / Vehicle</th>
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Table 1. Summary of foodborne outbreaks investigated in the Northern Territory in 2012
Acknowledgments

Michelle Green (née Harlock) was the NT OzFoodNet Epidemiologist for the first half of 2012. Members of the OzFoodNet network around Australia. Dr Peter Markey, Mary Verus, Dr Vicki Krause and the staff at the NT CDC public health units. Northern Territory Government Environmental Health. Staff from the Northern Territory Government Pathology Service (NTGPS). Western Diagnostic Pathology, Sullivan and Nicolaides Pathology, Healthscope Pathology, PathWest, IMVS and MDU.

References


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Table 2. Summary of non-foodborne outbreaks investigated in the Northern Territory in 2012

<table>
<thead>
<tr>
<th>Ref No</th>
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<th>Aetiology (no. lab. Confirmed cases)</th>
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Table 2. Summary of non-foodborne outbreaks investigated in the Northern Territory in 2012

www.ozfoodnet.gov.au

***************
Days at risk for acute rheumatic fever recurrence

Keith Edwards, CDC, Darwin

Abstract

The Northern Territory (NT) has very high rates of acute rheumatic fever (ARF) and its sequelae rheumatic heart disease (RHD).

The NT RHD Control Program works to prevent recurrences of ARF by promoting individuals at risk to have their injections of long-acting Benzathine penicillin (secondary prophylaxis) at 4 weekly intervals in a timely manner. On average 30% of all NT cases of ARF are recurrences. A recent audit of 5 to 19 year olds at risk of ARF showed that on any 1 day 20% to 67% were not protected and ‘at risk’ of recurrence because of delayed secondary prophylaxis.

To improve timely prophylaxis 3 clear messages are promoted:

1. to avoid any days at risk
2. to have the needle early in the 4th week and
3. that the 28th day is the last day to safely have the needle.

Acute Rheumatic Fever (ARF) is a disease of poverty which can follow episodes of Group A Streptococcal (GAS) infections either in the throat or in skin sores. Certain individuals react abnormally and produce antibodies and cellular inflammation which not only attack the bacteria, but can also affect the joints (arthritis), the heart (carditis) and sometimes the brain (chorea). Children from the age of 5 years are most likely affected and the peak incidence occurs from 10 to 23 years of age (Figure 1).

The joints are not permanently damaged but the heart often is, particularly the heart valves, leading to significant valve damage which may require surgery and can lead to premature death. The Northern Territory (NT) has one of the highest rates of ARF and Rheumatic Heart Disease (RHD) in the world. The NT RHD Control Program maintains a clinical register of patients who have had ARF in order to facilitate timely treatment and follow-up and thereby optimise the likelihood of long term survival. The main program goal is to prevent recurrence of ARF in an individual who has had a first episode. This can be achieved by protecting patients from streptococcal infection by the injection of long-acting Benzathine penicillin (LA Bicillin) at 4 weekly intervals. This is called secondary prophylaxis. Figure 1 shows rates of adherence to secondary prophylaxis by age group and it can be seen that adherence rates are lowest in the young adults where the incidence of ARF is highest.

Figure 1. Incidence of ARF and percentage adherence to secondary prophylaxis by age
Timely provision of secondary prophylaxis is the best way to prevent recurrence of ARF and damage to heart valves (RHD). The interval between injections of LA Bicillin is critical for this treatment to be successful. Too long, and the patient becomes unprotected and risks a recurrence of ARF, too short and the patient may be less keen to receive this painful preventative treatment and the increased workload may overburden the health clinic. Figure 2 shows the incidence of ARF each year and the percentage of cases which are recurrent and more likely to cause significant heart damage. On average, about 30% of ARF cases are recurrences over the 13 year period shown. These cases of ARF recurrence occur because of late or missed administration of LA Bicillin.

Initially, in Australia, secondary prophylaxis for ARF was given monthly, as this was easiest to achieve in a practical sense and there was historical evidence that a monthly regime could successfully prevent recurrence in other populations, even though, pharmacological studies show that penicillin levels in the blood drop to very low levels after the third week. With the growing realisation that recurrences were occurring at an unacceptably high rate, the decision was made by the NT RHD Control Program steering committee to change to a 4 weekly regimen. Even so, in the NT, the majority of ARF/RHD patients receive less than 80% of their LA Bicillin injections in 1 year (Figure 1) which means the interval between their injections is often well over 4 weeks.

![Figure 2. ARF recurrent episodes as percentage of total annual ARF episodes](image)

![Figure 3. Days at risk prior to recurrence of ARF for 21 clients aged 5-19 years](image)
As stated, the recurrence rate is unacceptably high. Efforts to increase the proportion of patients who receive more than 80% of their injections have included:

- continual staff and client education,
- regular contact with health clinics with feedback on their performance in terms of delivering secondary prophylaxis,
- performance auditing exercises to selected clinics using the ABCD approach.

These strategies have only had small effects, though a recent analysis of the ARF/RHD register revealed a 10% reduction in recurrence each year during the 10 year period prior to 2011. A recent audit of the ARF/RHD register looked specifically at how protected 21 5-19 year old patients were prior to their recurrence (Figure 3). This graph shows the proportion (%) of 5 - 19 year old patients who were not protected each day for the 3 month period prior to their recurrence. This reveals that each day between 20% and 67% of patients were not protected or were ‘at risk’ and that the peak period for risk was 49 to 58 days prior to recurrence. This figure clearly shows the extent of the risk of recurrence for these patients. This analysis led to the ‘days at risk’ concept and it was felt that this had potential to improve levels of secondary prophylaxis by:

- better informing health staff of the need to avoid ‘days at risk’ by giving the LA Bicillin on or before the 28th day, and
- better informing patients of their ‘potential days at risk’ and how to avoid a recurrence.

Currently, many patients wait to be recalled for their ‘needle’ by the clinic. As the recall is set at 28 days, by the time the patient is seen, days at risk have occurred. The NT RHD Control Program is therefore promoting 3 clear messages:

- Avoid any days at risk.
- Have your needle in the 4th week, early not late.
- The 28th day is the last day you can safely have your needle.

This will result in some clients receiving more than 13 injections in the year but if implemented well has the potential to reduce recurrences dramatically. This is shown schematically in Figure 4.

Figure 4. Flow chart for LA Bicillin administration for patients on secondary prophylaxis

The NT RHD Control Program is currently looking at ways to monitor days at risk for individual patients and also by clinic as this is likely to be a better indicator of successful protection than number of injections in a year. It is proposed to modify the register to automatically calculate this information and also to automatically reset the recall to 21 days after an ARF/RHD LA Bicillin has been given.

Reference


Acknowledgement

Ms Hanika Roberton, Medical Student analysed the Rheumatic Heart Disease Register data to create the graphs for this article. Data was extracted by Ms Christine Chamberlain, Register Co-ordinator, and other staff of the NT RHD Control Program.
The Northern Territory Immunisation Register

And then there was 1 …

Charles Strebor, CDC, Darwin

The Northern Territory Immunisation Register (NTIR) began operating in 1991, a full 5 years before the introduction of the Australian Childhood Immunisation Register. Initially, the NTIR recorded only childhood immunisations on what was then known as the Childhood Immunisation Database (CID). Over time, the scope of the NTIR grew to include adolescent vaccines given as part of school-based programs as well as some immunisations given to adults (e.g. Pneumovax 23, Hepatitis B) which were recorded on the Adult Immunisation Database (AID). In the early days of the NTIR a number of databases were used to record various vaccines, including catch-up programs for the Hepatitis B, Meningococcal C and the Measles, Mumps and Rubella (MMR) vaccines. In 2001 the old CID was transferred to the Community Care Information Systems (CCIS) and childhood vaccines were then all recorded on CCIS.

In early 2007 with the introduction of the Human Papilloma Virus (HPV) Vaccine, it was decided that this was best recorded on CCIS as recall lists could then be produced. In September 2007 all immunisations given in the Territory began to be recorded on CCIS. At the same time a process to integrate the older databases onto CCIS, beginning with the AID and then working through the Hepatitis B vaccine, the MMR vaccine and finally the Meningococcal C vaccines from the earlier catch-up programs.

In June 2013, the process of integrating the older databases onto CCIS was completed i.e. ‘1 database’, after almost 6 years of intensive work. This came from various staff members of the NTIR and particularly from the incredible work undertaken by Dorothy Hunter.

Now that the historical records are stored in the 1 place, it takes merely a few minutes to provide an immunisation record. To the NTIR staff this is a much welcome change from the previous system where it could take up to half an hour to gather together all of the required information to provide an accurate immunisation record.

Now there is 1 database … CCIS

***************

It is not too late to get or give the 2013 flu vaccine.
Join Tennant Creek in aiming to achieve high influenza vaccine coverage.
Chikungunya and Hendra virus infection now notifiable diseases

Peter Markey, CDC, Darwin

Both chikungunya and Hendra virus infection are now notifiable diseases in the Northern Territory following recent listing in the Government Gazette. Both diseases are notifiable by both doctors and laboratories, with Hendra virus infection being listed in the urgent category and chikungunya also urgent, if suspected to have been acquired in the Northern Territory. Chikungunya had been previously notifiable under ‘Arbovirus not elsewhere specified’, but now has its own category.

Both diseases are emerging infections with Hendra virus infection emerging in the eastern states since the late 1990s and chikungunya increasing in incidence in India, SE Asia and the Western Pacific over recent years.

Chikungunya virus is an alphavirus in the same genus as Ross River virus and Barmah Forest virus. It causes a similar syndrome with fever, rash, arthralgia, myalgia and headache. In general it tends to be more severe, with deaths being reported in the very elderly and the newborn. Recent cases have been reported in the NT that were acquired in Bali and there have been recent outbreaks in India and the Philippines.

Chikungunya is mostly transmitted by 2 vectors; the dengue mosquito (Aedes aegypti) and the Asian tiger mosquito (Aedes albopictus), neither of which are found in the NT due to our intensive mosquito surveillance program. Some mosquitoes species prevalent in the NT (Ae. notoscriptus and Ae. vigilax) have been shown in the laboratory to be able to transmit the chikungunya virus but it is thought that these species are unlikely to be efficient vectors.

Chikungunya is another reason to avoid being bitten by mosquitoes when travelling and another disease to consider in the unwell returned traveller. Testing is by serology (IgM or seroconversion). Not all labs perform chikungunya serology in an arbovirus screen so the specific test has to be requested.

Hendra virus infection emerged in the 1990s in Queensland (Hendra is a suburb of Brisbane in Queensland) and has had a high profile since due to its significant mortality. The natural reservoir for Hendra virus is fruit bats, but spillover can occur to horses and from horses to humans. There have been only 7 cases in humans but 4 have died. There have been no cases acquired directly from bats.

There have been no cases in horses or humans in the NT but there is evidence of Hendra virus in the NT fruit bat population.

There is a national guideline for the public health response to Hendra virus infection and making it a notifiable disease will assist implementing the response in the NT.

Neither chikungunya nor Hendra virus infection are on the national notifiable diseases list, however there is a national case definition for chikungunya and the national guideline for Hendra virus infection has adopted the Queensland case definition so the NT will use the same.

References

## Notifiable diseases to be reported in the NT

### Updated list of notifiable diseases available from:


Please update and discard old copies.

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**Notifiable by doctors:**

- AIDS
- Acute post-streptococcal glomerulonephritis
- Adverse vaccine reaction
- Amoebiasis
- Anthrax
- Arbovirus infection - not otherwise specified
- Australian bat lyssavirus
- Avian influenza
- Barmah Forest virus infection
- Botulism
- Bruceiella
- Campylobacteriosis
- Chancroid
- Chickenpox
- Chikungunya
- Chlamydia conjunctivitis
- Chlamydia genital infection
- Cholea
- Ciguatera fish poisoning
- Congenital rubella syndrome
- Congenital syphilis
- Creutzfeldt-Jakob disease
- Cryptosporidiosis
- Dengue virus infection
- Diptheria

**Notifiable by laboratories:**

- AIDS
- Acute post-streptococcal glomerulonephritis
- Adverse vaccine reaction
- Amoebiasis
- Anthrax
- Arbovirus infection - not otherwise specified
- Australian bat lyssavirus
- Avian influenza
- Barmah Forest virus infection
- Botulism
- Bruceiella
- Campylobacteriosis
- Chancroid
- Chickenpox
- Chikungunya
- Chlamydia conjunctivitis
- Chlamydia genital infection
- Cholea
- Ciguatera fish poisoning
- Congenital rubella syndrome
- Congenital syphilis
- Creutzfeldt-Jakob disease
- Cryptosporidiosis
- Dengue virus infection
- Diptheria

**Urgent for any penicillin resistant isolate:**

- HSV
- M. leprae
- Neisseria meningitidis
- Pneumocystis carinii
- Toxoplasma gondii

**Please notify CDC urgently by phone:**

- Ebola
- Lassa fever
- Rift Valley fever
- Zika

**Doctors please notify on clinical suspicion (while awaiting laboratory confirmation):**

- AIDS
- Chlamydia pneumoniae
- Coccidioidomycosis
- Cryptococcus neoformans
- Ebola
- Lassa fever
- Rift Valley fever
- Zika

**HTLV-1: Adult T cell leukemia/lymphoma and tropical spastic paraparesis notifiable by doctors:**

- HTLV-1

**CDC Numbers:**

- CDC Darwin (08) 8922 8944
- CDC Alice Springs (08) 8951 7340
- CDC Tennant Creek (08) 8662 4259
- CDC Katherine (08) 8973 9049
- CDC Nhulunbuy (08) 8987 0357

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June 2013

Centre for Disease Control


Updated list of notifiable diseases available from:


Please update and discard old copies.
Abstracts from peer reviewed published articles related to the Northern Territory

Risk of tuberculosis among people with diabetes mellitus: an Australian nationwide cohort study

C.C. Dobler,1,2 J.R. Flack,3 G.B. Marks1,2
1Department of Respiratory and Environmental Epidemiology, Woolcock Institute of Medical Research, University of Sydney, Sydney, Australia 2Department of Respiratory Medicine, Liverpool Hospital, Sydney, Australia 3Diabetes Centre, Bankstown-Lidcombe Hospital, Sydney, Australia


Objective: Previous studies that have found an increased risk for tuberculosis (TB) in people with diabetes mellitus (DM) have been conducted in segments of the population and have not adjusted for important potential confounders. We sought to determine the RR for TB in the presence of DM in a national population with data on confounding factors in order to inform the decision-making process about latent tuberculosis infection (LTBI) screening in people with diabetes.

Design: Whole population historical cohort study.

Setting: All Australian States and Territories with a mean TB incidence of 5.8/100 000. Participants: Cases of TB in people with DM were identified by record linkage using the National Diabetes Services Scheme Database and TB notification databases for the years 2001–2006.

Primary and secondary outcome measures: Primary outcome was notified cases of TB. Secondary outcome was notified cases of culture-confirmed TB. RR of TB was estimated with adjustment for age, sex, TB incidence in country of birth and indigenous status.

Results: There were 6 276 cases of active TB among 19 855 283 people living in Australia between 2001 and 2006. There were 271 (188 culture positive) cases of TB among 802 087 members of the DM cohort and 130 cases of TB among 273 023 people using insulin. The crude RR of TB was 1.78 (95% CI 1.17 to 2.73) in all people with DM and 2.16 (95% CI 1.19 to 3.93) in people with DM using insulin. The adjusted RRs were 1.48 (95% CI 1.04 to 2.10) and 2.27 (95% CI 1.41 to 3.66), respectively.

Conclusions: The presence of DM alone does not justify screening for LTBI. However, when combined with other risk factors for TB, the presence of DM may be sufficient to justify screening and treatment for LTBI.


T. L. Snelling,1 R. M. Andrews,1 C. D. Kirkwood,2 S. Culvenor,3 and J. R. Carapetis1
1Menzies School of Health Research and Charles Darwin University, Casuarina, Melbourne, Australia, and 2National Rotavirus Reference Centre and the Enteric Viruses Research Unit, Murdoch Children's Research Institute, Northern Territory, Australia

CID 2011:52 (15 January) d 191

Summary: The human rotavirus vaccine was evaluated during an outbreak of rotavirus G2P[4] infection in central Australia. No overall protective effect against hospitalization was demonstrated, raising concerns over the durability of vaccine protection against heterotypic strains.

Background: Two and a half years after commencing routine vaccination with human rotavirus vaccine, an outbreak of rotavirus G2P[4] infection occurred in central Australia. Vaccine effectiveness against a P[8]-containing strain (G9P [8]) had been demonstrated previously in this setting. This subsequent outbreak provided the opportunity to evaluate vaccine effectiveness against hospitalizations for a non–vaccine-related genotype in the same population.

Methods: A case-control study was nested within a cohort of vaccine-eligible children listed on a population based immunization register. Children with rotavirus-confirmed gastroenteritis were individually matched by date of birth and Indigenous status with 4 control subjects.

Results: Forty-one cases met the inclusion criteria, and 21 were severe cases among infants aged <12 months. Nineteen (46%) of 41 case patients had received 2 doses of human rotavirus vaccine, compared with 87 (53%) of 164 control subjects. Vaccine effectiveness against rotavirus-related hospitalization was 19% (odds ratio, .81; 95% confidence interval, .32–2.05) for 2 doses compared with none. On secondary analysis, there was evidence of a protective effect against disease complicated by acidosis in the subset of infants aged, 12 months (odds ratio, .15; 95% confidence interval, .03–.84).

Conclusions: Evidence was not found for an overall protective effect of human rotavirus vaccine against hospitalization for rotavirus disease in this setting. Post hoc analyses suggested a protective effect against severe disease in young infants.
## NT NOTIFICATIONS OF DISEASES BY ONSET DATE & DISTRICTS

1 January—30 March 2013 & 2012

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<tr>
<td>Dengue</td>
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<td>Food/water borne disease</td>
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<td>117</td>
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<td>Hepatitis B - chronic</td>
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<td>16</td>
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<td>Melioidosis</td>
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<td>0</td>
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<td>0</td>
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<td>Non TB Mycobacteria</td>
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<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Q Fever</td>
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<td>Rheumatic Fever</td>
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<td>0</td>
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<td>6</td>
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<tr>
<td>Ross River Virus</td>
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<td>4</td>
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<td>1</td>
<td>65</td>
<td>75</td>
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<tr>
<td>Rotavirus</td>
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<td>3</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>6</td>
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<tr>
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<td>23</td>
<td>40</td>
<td>8</td>
<td>5</td>
<td>66</td>
<td>83</td>
</tr>
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<td>Shigellosis</td>
<td>8</td>
<td>41</td>
<td>9</td>
<td>9</td>
<td>5</td>
<td>9</td>
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<td>Syphilis &lt; 2y</td>
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<td>Syphilis &gt; 2y or unknown</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>8</td>
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<td>236</td>
<td>17</td>
<td>34</td>
<td>229</td>
<td>204</td>
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<tr>
<td>Tuberculosis</td>
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<td>0</td>
<td>0</td>
<td>12</td>
<td>4</td>
</tr>
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<td>Typhoid</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
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<td>2</td>
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<td>Zoster</td>
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<td>6</td>
<td>1</td>
<td>2</td>
<td>30</td>
<td>33</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>652</strong></td>
<td><strong>953</strong></td>
<td><strong>72</strong></td>
<td><strong>102</strong></td>
<td><strong>1,366</strong></td>
<td><strong>1,417</strong></td>
</tr>
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</table>

The Northern Territory Disease Control Bulletin Vol 20, No. 2, June 2013
Ratio of the number of notifications in 1st quarter 2013 to the mean 2008-12: selected diseases

Ratio of the number of notifications in 1st quarter to the mean 2008-12: sexually transmitted diseases
Comments on notifications p32

HIV

Only 1 case was notified in this quarter compared to the 5 year mean of 4.2 and 6 in the first quarter of 2012. There were 36 cases for all of 2012, the highest annual figure on record, so this low figure may represent a return to the pre-2012 rates.

TB

There were 16 TB cases notified in the first quarter compared to the 5 year mean of 7.4. This increase was due to a combination of cases in residents of local detention centres and newly arrived immigrants.

HTLV1

23 cases of HTLV1 were notified in the first quarter compared with an expected number of 16. This increase is likely to be due to an increase in the amount of testing being done following the recent raising of awareness at local level following a regional workshop. Further investigation into the epidemiology of HTLV1 is being planned.

Chickenpox

There were 39 notifications for chickenpox in the first quarter which is twice the expected number of 19.5 based on the 5 year mean. This is likely to be due to an increase in the number of tests being done as health care providers become more aware of the availability of polymerase chain reaction (PCR) tests. This increase will be further investigated.

Barmah Forest

There were 134 notifications of Barmah Forest virus infection in the first quarter, 4.7 times the 5 year mean of 28. This is in contrast with low levels of Ross River fever virus and low levels of mosquito activity. An investigation into this outbreak is continuing and a national working party has been established to look at similar increases in other states.

***************

NT malaria notifications January—March 2013

Elizabeth Stephenson, CDC, Darwin

There were 6 cases of malaria notified in the 1st quarter of 2013. The following table provides details about where the infection was thought to be acquired, the infecting agent, whether chemoprophylaxis was used and where the patient lived.

<table>
<thead>
<tr>
<th>No. cases</th>
<th>Origin of Infection</th>
<th>Reason Exposed</th>
<th>Agent</th>
<th>Chemoprophylaxis</th>
<th>NT Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Uganda</td>
<td>Recreation</td>
<td><em>P. falciparum</em></td>
<td>Yes</td>
<td>Darwin</td>
</tr>
<tr>
<td>1</td>
<td>Kenya/Sudan</td>
<td>Expatriate visiting relatives</td>
<td><em>P. falciparum</em></td>
<td>Yes</td>
<td>Darwin</td>
</tr>
<tr>
<td>1</td>
<td>Indonesia Jayapura</td>
<td>Expatriate visiting relatives</td>
<td><em>P. falciparum</em></td>
<td>No</td>
<td>Darwin</td>
</tr>
<tr>
<td>1</td>
<td>Indonesia West Papua</td>
<td>Visiting student</td>
<td><em>P. falciparum</em></td>
<td>No</td>
<td>Darwin</td>
</tr>
<tr>
<td>2</td>
<td>Indonesia West Papua</td>
<td>Visiting student</td>
<td><em>P. vivax</em></td>
<td>No</td>
<td>Darwin</td>
</tr>
</tbody>
</table>
Immunisation coverage

Compiled by Charles Strebor, CDC, Darwin

Immunisation coverage rates for NT children by regions based on Medicare address postcode as estimated by the Australian Childhood Immunisation Register are shown on page 35.

Background information to interpret coverage

Winnellie PO Bag is postcode 0822, which includes most Darwin Rural District communities, some East Arnhem District communities and some people who live in the Darwin ‘rural area’ who collect mail from the Virginia store or Bees Creek. Alice Springs PO Bag is postcode 0872, which includes Alice Springs District, Nganampa and Ngaanyatjarra communities.

The cohort of children assessed at 12 to <15 months of age on 31 March 2013 were born between 1 Jun 2011 and 30 September 2011 inclusive. To be considered fully vaccinated, these children must have received 3 valid doses of vaccines containing diphtheria, tetanus, pertussis, 3 doses of vaccines containing poliomyelitis antigens, either 3 or 4 doses of PRP-OMP Hib or 4 doses of another Hib vaccine, and 3 doses of hepatitis B vaccine. All vaccinations must have been administered by 12 months of age.

The cohort of children assessed at 24 to <27 months of age on 31 March 2013 were born between 1 June 2010 and 30 September 2010 inclusive. To be considered fully vaccinated, these children must have received 3 or 4 valid doses of vaccines containing diphtheria, tetanus, pertussis, 3 doses of vaccines containing poliomyelitis antigens, either 3 or 4 doses of PRP-OMP Hib or 4 doses of another Hib vaccine, and 3 doses of hepatitis B vaccine and 1 dose of measles-mumps-rubella (MMR) vaccine. All vaccinations must have been administered by 24 months of age.

The cohort of children assessed at 60 to <63 months of age on 31 March 2013 were born between 1 June 2007 and 30 September 2007 inclusive. To be considered fully vaccinated, these children must have received 4 or 5 valid doses of vaccines containing diphtheria, tetanus, pertussis antigens, 4 doses of poliomyelitis vaccine and 2 valid doses of MMR vaccine. All vaccinations must have been administered by 60 months (5 years) of age.

Interpretation and comment

The vaccination coverage rates for children in the NT are comparable with the national average for all age cohorts.

Further information about the Australian Childhood Immunisation Register coverage may be found at: http://ncirs.edu.au/immunisation/coverage/index.php

***************
Immunisation coverage for children aged 12-<15 months at 31 December 2012

<table>
<thead>
<tr>
<th>Numbers in district</th>
<th>%DTP</th>
<th>%Polio</th>
<th>%HIB</th>
<th>%HEP</th>
<th>% Fully</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin</td>
<td>277</td>
<td>91.0%</td>
<td>91.0%</td>
<td>91.0%</td>
<td>91.0%</td>
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<td>93.8%</td>
<td>93.8%</td>
<td>93.8%</td>
</tr>
<tr>
<td>Palm/Rural</td>
<td>193</td>
<td>88.6%</td>
<td>88.6%</td>
<td>88.6%</td>
<td>88.6%</td>
</tr>
<tr>
<td>Katherine</td>
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<td>91.2%</td>
<td>91.2%</td>
<td>91.2%</td>
<td>91.2%</td>
</tr>
<tr>
<td>Barkly</td>
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<td>95.7%</td>
<td>95.7%</td>
<td>95.7%</td>
<td>100.0%</td>
</tr>
<tr>
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<td>89.9%</td>
<td>89.9%</td>
<td>89.9%</td>
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<td>97.4%</td>
<td>97.4%</td>
<td>97.4%</td>
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Immunisation coverage for children aged 24-<27 months at 31 December 2012

<table>
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<tr>
<th>Numbers in district</th>
<th>%DTP</th>
<th>%Polio</th>
<th>%HIB</th>
<th>%HEP</th>
<th>% MMR</th>
<th>% Fully vaccinated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin</td>
<td>269</td>
<td>92.6%</td>
<td>92.6%</td>
<td>92.6%</td>
<td>91.1%</td>
<td>90.7%</td>
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<td>95.9%</td>
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</tr>
<tr>
<td>Palm/Rural</td>
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<td>96.4%</td>
<td>95.5%</td>
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<td>97.5%</td>
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<td>84.6%</td>
<td>84.6%</td>
<td>84.6%</td>
<td>84.6%</td>
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<tr>
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<td>98.5%</td>
<td>98.5%</td>
<td>98.5%</td>
<td>97.7%</td>
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<td>97.7%</td>
<td>100.0%</td>
<td>97.7%</td>
<td>100.0%</td>
</tr>
<tr>
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<td>87.0%</td>
<td>88.9%</td>
<td>87.0%</td>
<td>90.7%</td>
</tr>
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<td>95.6%</td>
<td>94.5%</td>
<td>94.4%</td>
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</tbody>
</table>

Immunisation coverage for children aged 60-<63 months at 31 December 2012

<table>
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<th>Numbers in district</th>
<th>%DTP</th>
<th>%Polio</th>
<th>%MMR</th>
<th>% Fully vaccinated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin</td>
<td>269</td>
<td>89.6%</td>
<td>89.6%</td>
<td>88.8%</td>
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<td>96.7%</td>
<td>96.7%</td>
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<td>92.6%</td>
<td>92.6%</td>
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<td>Katherine</td>
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<td>97.8%</td>
<td>97.8%</td>
<td>97.8%</td>
</tr>
<tr>
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<td>17</td>
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<td>88.2%</td>
<td>88.2%</td>
</tr>
<tr>
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<td>87.3%</td>
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<td>95.9%</td>
<td>95.9%</td>
</tr>
<tr>
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<td>50</td>
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<td>94.0%</td>
<td>94.0%</td>
</tr>
<tr>
<td>NT</td>
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<td>91.7%</td>
<td>91.7%</td>
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<td>Australia</td>
<td>76,239</td>
<td>92.4%</td>
<td>92.3%</td>
<td>92.1%</td>
</tr>
</tbody>
</table>
Centre for Disease Control staff updates April—June 2013

Top End

The NT Immunisation Register team (NTIR) were recently nominated for the Administrator’s Medal in Primary Health Care 2013 in recognition of the unique role that they play in providing primary health care providers across the Northern Territory with critical immunisations information. Congratulations to the team on their nomination.

Jo O’Neill and Natalie Skultety with the certificate of nomination

Elizabeth ‘Liz’ Adrian began working as an Immunisation Data Entry Officer in Darwin with the NTIR in June 2013. Liz comes to us with a background in the private health sector.

Roxana Sherry commenced as the new Sexual Health Nurse in Clinic 34 in Darwin in May. In March Joel Curtain and Debi Bodden commenced in Darwin and Michael O’Halloran in Katherine in the Adolescent Sexuality Education Program. Also in March Kelly Hosking commenced in the Top End Remote Sexual Health Program in Darwin.

Marilou Lehmann has commenced as Business Manager, coming from a similar position with Alcohol and Other Drugs, following the resignation of Tamara Pearce who has moved to Canberra.

Central Australia

Ruth Primrose, trachoma nurse based in Alice Springs for 2 years, left the program in April. Ruth has moved to a role as a Remote Child Health Nurse in Central Australia Remote Health, and has assured us she will continue her work as a trachoma ambassador in her new role!

Katie Lynch commenced in the role of trachoma nurse, Central Australian team in April. Katie has a strong interest in Public Health, and has moved from Queensland to join the trachoma team in Alice Springs.

Kate Wales commenced in the role of trachoma nurse, Central Australian team in May. Kate comes to the position in Alice Springs with a variety of nursing experience, and most recently has been working in Occupational Health.

Lorraine Gepperth, the trachoma program Administration and Data officer, finished in the program in June to return to her substantive position.

Eamon McIntyre has joined clinic 34 in the position of Sexual Health Nurse (N4) – Remote Sexual Health Program. Eamon has been working and specialising in Sexual Health / Public Health since 2004. Before arriving in Alice Springs Eamon held the position of Katherine Regional Coordinator – Men’s Sexual Health. Before that he worked for SHine SA (Sexual Health: information, networking and education) in the Northern Suburbs of Adelaide.

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